July-August 1983

SINCUS

VOL 1, NO. 7

NEW MEETING PLACE

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PEEK *a MEMBER
by Gary Ennis

Our PEEK*a Member subject for this month took us to the home of Wes Brzozowski, an electrical engineer by occupation, had long been interested in computers, particularly ones using the Z80 microprocessor chip. Having even toyed with the idea of building his own computer using the Z80, Wes jumped at the chance to buy the kit for the Sinclair ZX-81. He reasoned that the ZX-81 kit gave him "an inexpensive way to have a Z80 type computer that" he "could hang more junk on." Being a "tinkerer", Wes wanted to improve on the Sinclair. In fact, even today Wes says that he spends too much time trying to make it into a better computer than he does using the better computer he already has!

Assembly presented few problems. Wes did have some pins break through the tape and contact the ground strip, but the biggest problem he had was lack of sleep! Once the kit arrived he could not put it down and worked well into the night. He then took a vacation day the next day to correct the problems and fire up the ZX-81! He is probably not the only one to have done this. Later his father would buy a kit and send it to Wes for assembly.

After about six months of working within the limits of 1K, Wes saw the virtues of the 16K RAM pack while visting his father out west. He does not regret the time spent without a 16K RAM, however, he felt it helped him learn the disciplines of compact programming plus learn just how the ZX-81 memory is organized. One early project was to disassemble the ROM by hand. (This does not mean take it apart, it means checking every address of the ROM). The ROM is 8K, that is 8 times 1024 bytes, and that is when Wes found out "that 8K is a very big number!" He never completed the project by hand, but he learned a lot

He is set up on a bookcase in a study and the first thing that you notice is the "volt meter" next to an array of connections at the rear connector. It is not a voltmeter, but rather a fourth generation Brzozowski Box for Computer Cassette Compatibility, hereafter referred to as the "Black Box. This is the fourth and most sophisticated unit he has built to monitor the load/save procedure as well as let him hear the signal, get a reading on the meter, plus "clean up" signals of poor quality cassettes to insure loading. The "Box" is very professional and expensive looking-with neatly labelled knobs and switches. Wes says the "Box" has maybe $40 worth of materials and that he did spend nearly as much time on the case as he did wiring up the inside.

Additionally, Wes has built a keyboard that plugs into the rear edge connector. Wes wants to avoid wiring into the computer itself as these wires inevitably will come loose due to moving the computer around. That doesn't mean he hasn't opened his ZX-81 up once he had it built. Far from it-he couldn't get another wire inside the computer without using a shoe horn. Other "junk" he has added include a reset system-the "Box" has the ON/OFF switch-hardware to produce 64 characters (which he has used to produce lower case letters!)-even a switch that turns off the repeat key (even though he hasn't built the keyboard with a repeat key on it!).

He also has a collection of Sinclair reject RAM packs that he got at a ridiculous price. Five of them were easily repaired. The most interesting one is the one with the "chirping oscillator".

Software selections include utilitarian things like "Tool Kit", "Assembler", "Disassembler", and "Hot Z". He also has some games.

Wes has just purchased a TIMEX 2040 printer and he likes it very much, using it primarily for program listings. He particularly prefers the paper of the TIMEX over that used on the Sinclair version.

Several software projects warrant mentioning. First, it seems Wes and his family enjoy another pasttime-launching homemade rockets! So Wes developed a program that computes the altitude the rocket will achieve given such variables as launchsite altitude, temperature, the thrust of the engine, weight and etc. He says it allows him to pick an engine size that will give him a good launch but avoid losing the rocket in the clouds!

Though the hour was too late to demonstrate it, Wes told me how he uses a "choo choo" train to help teach his small daughter the letters of the alphabet. The train moves across the screen and stops at a letter. When the child presses the key with that letter, I understand a smiling face rewards them and the train moves to another letter.

Several programs were developed because Wes wanted to find out how to beat the system i.e. copy programs that could not be copied. Also, because of his programming work is usually machine code, he is concerned that he does not "drop a bit" in loading/saving. So he has two "Checksum" programs - one of which can just go at the head of each BASIC program and is invisible - that is the program comes up running unless the checksum is wrong then you get a load check failed prompt. Wes also demonstrated a unique program that listens to a loading program in, I believe, 64 byte groups and plots a bar graph of the sound. By turning the volume up or down you can determine the most desirable volume setting. It is a fascinating idea!

Wes Brzozowski is an extremely well organized computer hobbyist. An expert on circuit design in electrical engineering he combines the engineering knowledge with strong communicative skills and the patience of a saint. I gained much insight into the hardware that can be "hung on the Sinclair" by "tinkerers" like Wes. In fact, I trusted him to open my TIMEX/Sinclair up and drill more ventilation holes. Thank you Wes for that assistance.

But Wes' strong suit is his enthusiasm for the Z80, the Sinclair, and the hobby. If you saw his first presentation at the June meeting on machine code, you saw that enthusiasm and communications skills. I mean Wes made "twos compliment" sound exciting!

He concluded our interview with the observation that the Z80 is a slick microprocessor and the Sinclair is a marvellous toy for the price. I learned a great deal in our several hours at his home and appreciate the chance to have visited him.

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POKES BY PAUL
by Paul Hill

SINCUS has barely gotten off the drawing board and already its existence, which depends on the Sinclair computer, is being question- ed! Good, in this computer age what is new today is ho hum tomorrow. The next generation of Sinclair computers is soon to hit the market. With it will be a new generation of owners with questions and prob- lems. And in a couple more years another generation, ad infinitium. Members who cut their programming teeth on the ZX-81 or TS 1000 may go on to bigger and more fancy machines. What can SINCUS do? It can still meet, members can still be a bunch of good, down to earth types, involved with the Sinclair, help each other, learn from one another and pick up new members with new computers, and learn from them. In the back of my mind, I've got an eye out for the new 2000 series, but figure if history repeats itself, the 2000 will be selling for a lot less a year from now, the bugs will be exposed and a lot of ideas on it will be in magazines. In the meantime a printer will have to keep me busy and off the streets this winter.

This club is much like some of the computer magazines, some is- sues likes some meetings are more interesting than others, some arti- cles like some talks are more interesting than others. I pay a lot for the magazines and it had better be good or I won't buy another without a good look! Likewise meetings had better do me some good or I won't be back. With magazines a large paid crew is putting it out, with the club it is a few volunteers!

by Paul Hill
President, SINCUS

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TIMEX 2000 SERIES (AVAILABLE AUGUST 1983)

(Reprinted from TIMEX Computer Corporation brochure)

MEMORY:
Total on board memory   T/S 2048   40K   T/S 2068   72K
   Expandable via over 200 64K memory expansion banks

KEYBOARD:

Style:	Full travel
Number of keys	42 keys
Automatic repeat	Yes
One-touch keyword entry	Yes
Reset key	Yes
Graphics on keyboard	16
User defined graphics accessed via keyboard	21

DISPLAY

TV	Yes
Size (characters/lines)	32 x 24
Animation	Two separate program selectable 32 x 24 displays can be used
Resolution	256 x 192 pixels

FULL WIDTH MODE

Display monitor	Yes
Size (characters/lines)	64 x 24
Resolution	512 x 192 pixels

PLUS - 4 channel, programmable, 8 octaves sound; interface for two joysticks, cartridge software, high speed cassette load (16K in 100 seconds), upper/lower case; and under $200.

LPRINT "THE T/S 1500"

(Reprinted from the newsletter of The Boston Computer Society,
Sinclair-Timex User Group Newsletter)

"HIGHLIGHTS OF THE MAY MEETING"

Sue Mahoney surprised us this month by bringing a prototype of
the long rumored but just announced TS-1500. The 9 1/8 by 5 3/8
by 1 3/4 inch silver box is an improved version of the TS-1000. It
has moveable keys, 16K of RAM, better filtering to make tape load-
ing and saving more reliable, and some ROM improvements (particu-
larly the printer bug is gone). You will also be able to plug in
your 16K RAM pack into it to get 32K. Sue said the T/S 1500 will
list for $79.95 and will be shipped to distributors in July. The
T/S will continue to be sold at its lower price. The most marked
improvement we saw was in the T/S 1500 keyboard, which employs the
same conductive rubber technology as the Sinclair Spectrum, but
doesn't have the Spectrum keyboard's "squashy" feel. In addition
none of the screws holding the box together were under footpads.

THE T/S 1500

As you read in the highlights, the T/S 1500 is an improved
version of the T/S 1000 in T/S 2000 packaging. With a nice key-
board, 16K of RAM, and an $80 list price, they should be in the
stores by August--but they won't stay there very long. What do
you do with your 16K RAM pack? Just plug it into the T/S 1500 edge
connector (all the connectors are on the back,by the way) and run
with 32K. In order to accomplish this nice little feat, we figured
TIMEX has to redesign the custom uncomitted logic array chip (ULA
or mystery chip, as we call it). Indeed they did. Instead of a
40-pin bipolar chip, it will have a 68-pin CMOS chip! CMOS tech-
nology greatly reduces the power consumption, eliminating possible
heating problems, and allowing for far longer operating time from
batteries. A new chip also allowed the ROM to be completely de-
coded to the bottom 8K of memory.

TIMEX also announced that the T/S 1500 will also feature solid
-state cartridge software and 8-bit bank switching to give 64 mega-
bytes of addressability--like the T/S 2000 series (series?). Will
it use the new Z800 chip when it becomes available? The only change
to the bus will be the chip select from the ROM.

The ROM will also be different. The changes will: fix ROM bug
#3 (ed. note that's the printer bug); modify the compare routines
so that floating-point numbers like 13.0 are equal to 12.999999999-
999! Also add to the reboot routine at 03CA hex for tuning to the
proper TV channel (no more switch on the bottom). None of these
changes should affect the T/S 1500's compatibility with the exist-
ing software base of the T/S 1000 and Sinclair ZX-81.

(both articles are reprinted from the Boston Computer Society,
Sinclair-Timex User's Group Newsletter, Volume 2, Issue 6, June '83)

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2K EXPRESS
by GARY ENNIS

NEW - much of this issue is devoted to the three new computers to be available in the next sixty days from TIMEX. They include the much rumored T/S 1500 (it is a T/S 1000 in a Spectrum case with 16K built in, plus several other improvements, for $79.95), and the TIMEX 2000 series of color computers. By the way when you read the T/S 2068 has 72K built in memory, please understand that it has 48K of on board RAM, the rest is 16K of ROM and unused RAM. TIMEX is just doing what several of their competitors do - advertise the total memory leading you to believe there is more there than there really can be used by you. Future products from TIMEX include - the Modem, another (presumably more professional printer) and a monitor. Also the 2000 series and the 1500 will use ROM cartridges (expected to be as large as 32K and priced $9.95 to $24.95)

HEADLINES - a Japanese company just broke ground in North Carolina for a plant that is to produce 3 million 64K RAM chips annually plus work on the 256K RAM chip. Japan currently produces 70% of the 64K RAM chips in the world and has increased production earlier this year There also was an interesting article in Newsweek, July 4th issue, comparing the U.S. and Japan in their approaches to the development of the super computers and building a machine that thinks!

OVERHEATING - not only you, but your computer has been suffering in this very hot summer. I have experienced several problems including premature crashes and the manipulation of program commands. Thanks to Wes Brzozowski, I have a series of small holes drilled under the heat sink (extending the slots and between the slots). Also rubber feet (Radio Shack 79¢) were added, they were attached to the existing rubber feet. This caused me to make a small platform out of corrugated cardboard and rubber feet. So far all works well and the problems seemed to have disappeared.

AUTHORS WANTED - one of the biggest needs of this hobby and one of the easiest thing for a hobbyist to do is to write an article about a program that they like. This does not have to be an in depth analysis of the structure of the program. Just write I bought the program "Biorhthyms at Unicorn Electronics for $9.95 and I use it to predict my compatiblity. You can use it for .... etc. Just simple descriptions of how you use it, why you like it, where you got it, and (if it applies) anything you wish had been done differently. Just write or type it up and mail it to the Editor of the newsletter (address is on page 3).

DON'T FORGET - TIMEX COMPUTER CORPORATION HOTLINE IS 800-24-TIMEX!

ALSO DON'T FORGET - as per notices in this newsletter, all items are to be returned to the club library for inventory. Please assist the "librarians" by returning the items right now.

MORSE CODE ON THE T/S1000! If you had come to the last couple meetings you could have seen Dave Schoenwetter's program that interprets morse code signals and prints the character on the screen! It is in machine code and in less than 2K! Dave tapes the incoming signal and then "plays the recorded morse code" to the computer. He is working on an interface so he can plug his radio right into the computer!

SUMMER SPECIALS - summer reruns should cut down on family TV time, so why not have a family computer project to help everyone become more computer literate!

NO ISSUE OF SINCUS IN AUGUST - SEE YOU IN SEPTEMBER! Gary

LPRINT-"VU-CALC" by Robert Masters

VU-CALC is Sinclair's spread sheet program. It essentially re-
places the accountant's analysis sheets. It is a table made up of box-
es. Each box can contain a number, a label or title, or the result of
a formula that is attached to the box. Each box has up to 8 characters
The VU-CALC table is 36 columns by 26 rows, or 936 boxes. The dis-
play is a "window" of 3 columns by 9 rows. It is easy to move around
and change the location of the window using the arrow keys (5-8)
Forty formulae are allowed on the table. This sounds like a lim-
ited number until you understand the powerful use of formulae in VU-
CALC. It took me several hours. A formula can be set up in many box-
es. A "relative" formula will act as a template and change the boxes
if references as the formula is moved around. A single instruction
will assign a formula to an entire row or column of boxes.
A formula can be up to 32 characters long. It can be constructed
with numbers, box references, parantheses, and four operations:+-*/.
After data, titles, and formulae have been assigned, a calculate
instruction is entered. This evaluates all formulae and places the
results into boxes where the formulae are attached. The calculation
time will vary from a few seconds to about a minute, depending on the
complexity of the formulae. The calculation in VU-CALC is done sequen-
tially by row, making it critical that a formula only references boxes
above and to the left of the box it is attached to.

STRENGTHS:
1. Economical (summer special at Gladstone is under $10)
2. Reliable. Program loaded on first try and ran reliably. I found
no bugs in the program - it is mostly machine language.
3. Easy to use. Most instructions are single keystrokes that work
logically and quickly. It took me a while to get used to the instruc-
tions. There is good error trapping. I have never had to start over.
4. Fast. The instructions, including calculate, work quickly. The per-
formance is surprising. Entering your data and titles can take quite
a while, but that is a function of the amount of information entered.
5. Good utility. The program can be put to practical use.
6. Powerful. VU-CALC is surprisingly powerful, especially in its use
of the respective formulae.

WEAKNESSES:
1. Small window-would like to see more of the table at one time. This
is limited by the display size. (ed. note 32 x 22)
2. Table flexibility. Once data is set, it cannot be easily moved a-
round the table. For example, data in rows or columns cannot be ex-
changed.
3. Titles.The window cannot be made to keep titles over columns. It is
sometimes difficult to remember position of the screen. Row and column
numbers are maintained as reference/location indicators.
4. Left Justification. I am used to seeing numbers with right justifi-
cation, centered on the decimal point.

SUMMARY
VU-CALC is an excellent purchase and I recommend it. Three actions
should be taken to minimize the weaknesses and maximize the performance
1. Carefully draw out the table before entering data and formulae.
2. Regularly repeat title boxes to keep a reference on the screen.
3. Work at fully understanding how formulae are used in developing
the first serious work application.

TIMEXly TIPS

TRY THIS: 24 LINE DISPLAY

```
10 POKE 16418,Ø
20 FOR N = 1 TO 64
30 PRINT "_____etc."; [ANY 12 CHARACTERS]
40 NEXT N
50 PAUSE 200
60 CLS
70 GOTO 10
```

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LEARN YOUR "PRINT AT" COORDINATES:

```
10 PRINT AT Ø,Ø; "ENTER A NUMBER FROM 1-30"
20 INPUT X
30 PRINT AT Ø,Ø; "ENTER A NUMBER FROM 1-20"
40 INPUT Y
50 PRINT AT Ø,Ø; "THIS DEMONSTRATES PRINT AT"
60 PRINT AT Y,X; "O"
70 GOTO 10
```

+ +

```
10  INPUT A
20  INPUT B
30  LET X = (A=B)*2
40  PRINT X,
50  GOTO 10
```

WHAT'S HAPPENING HERE?